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Gas Journal

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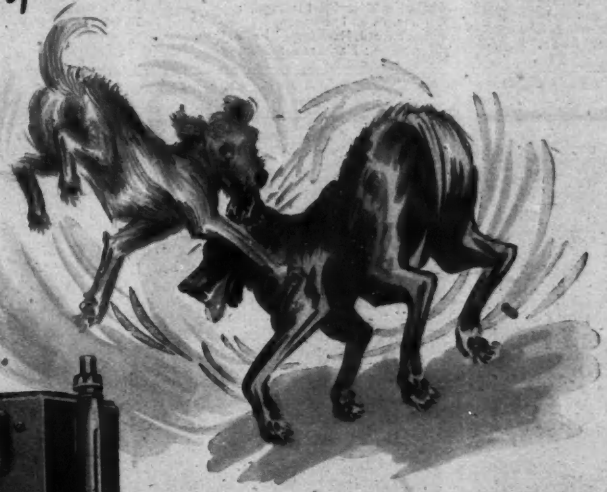

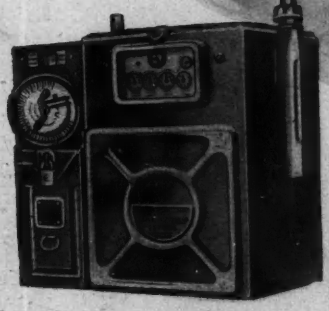

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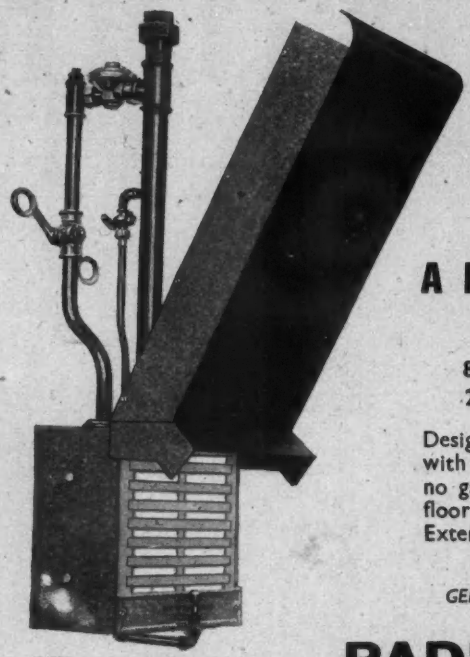

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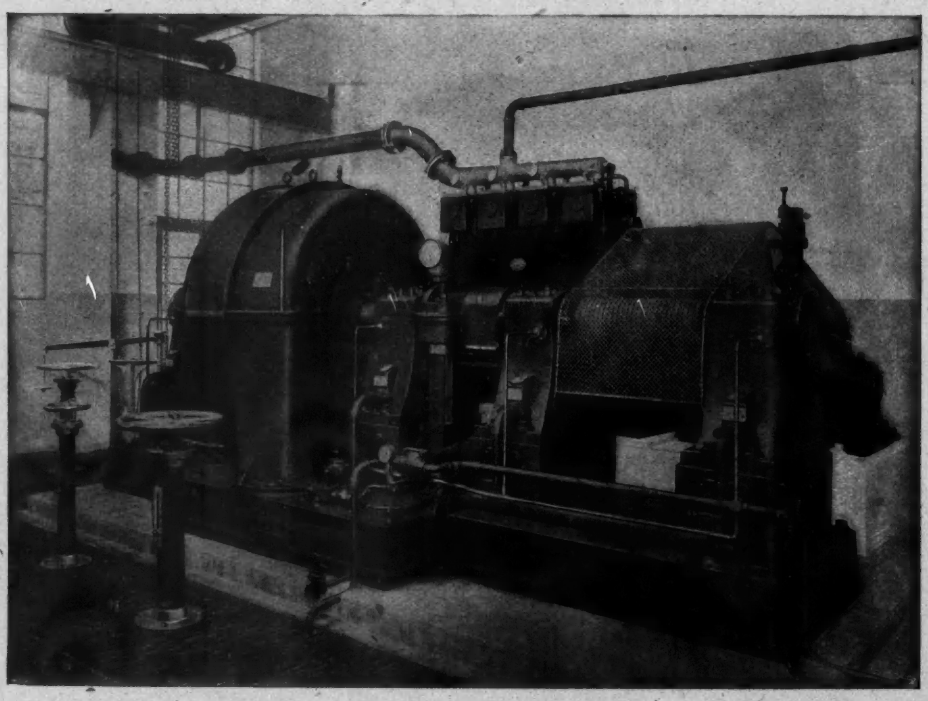

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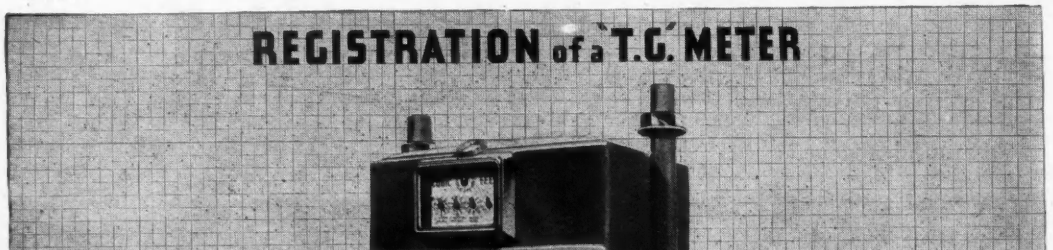

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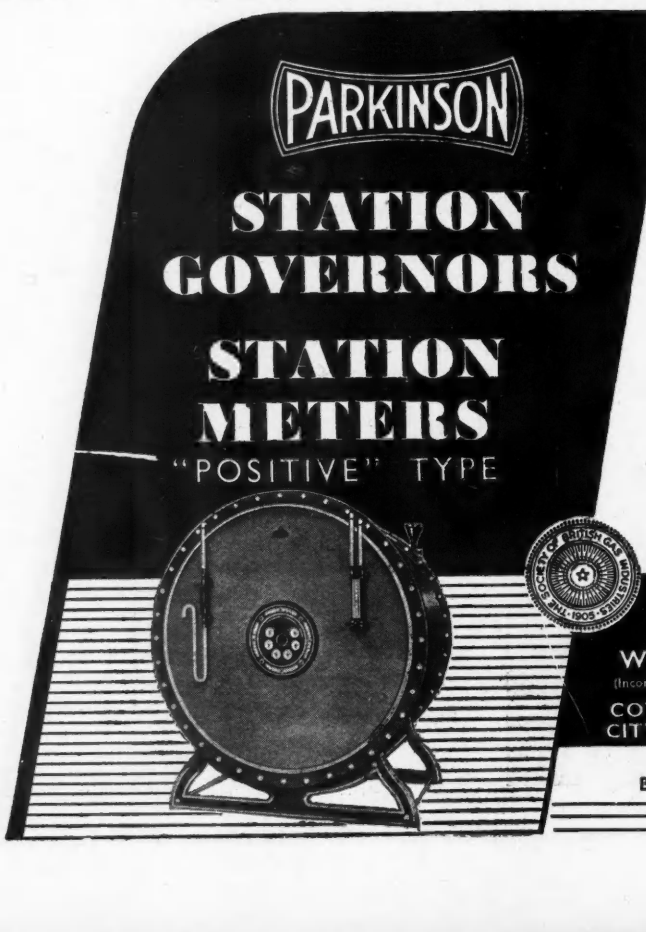

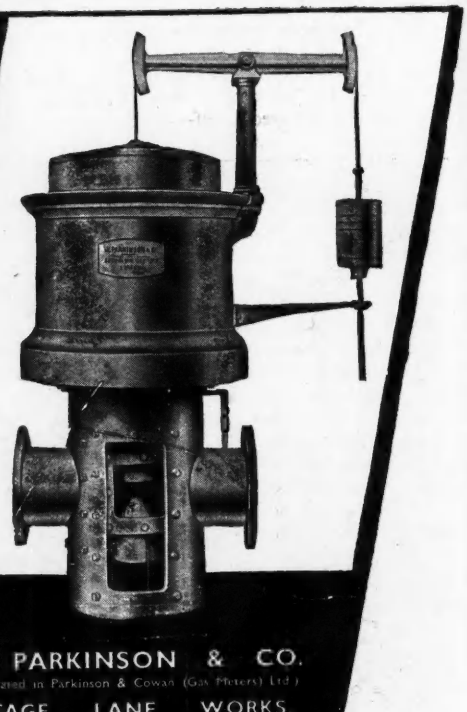

THE SOCIETY OF BRITISH GAS INDUSTRIES 1905

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P.6

GAS JOURNAL, NOV. 3, 1943
VOL. 242 95th YEAR No. 4198

EDITORIAL NOTES

THE PLANNING REPORT

NOW that the Gas Industry has carried out its contract, and placed in the hands of the Minister of Fuel and Power its Report on the Planning of the Gas Industry, it will, we hope, be able to proceed without delay to get down seriously to the work of planning. Does this sound harsh in the ears of those who have toiled long hours in the collecting and sifting of evidence, who have so painstakingly fostered the development of draft into redraft, and of redraft into Report? We think not. We believe that they will be well satisfied if their work is regarded as the basis for a great effort by the whole Industry on its own behalf; that possibly the sound they most dread to hear is that sigh of relief with which, on previous occasions, the Industry, having investigated one or other of its problems, has deposited its findings on a high shelf before relaxing luxuriously. No; this time there must be no high shelves, and we are quite certain that, if there is any relaxation, other influences will see to it that it is unattended by luxury.

Let us, for the sake of historical record, briefly recall that the Postwar Planning Committee of the Gas Industry was called into being under the ægis of the British Gas Federation in September, 1941, "to collect and collate relevant information and to consider the steps to be taken by the Industry to place it upon such a basis that it can best meet the altered conditions of the future and make the largest possible contribution to national and social welfare and to report to the constituent bodies." It was largely at the instigation of the President of the Board of Trade, which was at that time interested in the Gas Industry, that the enquiry was set afoot. The Board's interest, through no fault of its own, but owing to the task delegated to it by Parliament, was largely limited to seeing that the Industry behaved itself—that it did not kick off what have so often been termed by its leaders the "fetters" of restrictive legislation. When the Ministry of Fuel and Power was formed in June, 1942, the Industry felt that this was truly the answer to one of its prayers, and that it could look forward to a different type of guardianship to that previously exercised, however unwillingly, by the Board. It anticipated, in fact, an era in which a welcome series of "do's" would be substituted for the wonted "don'ts" of the erstwhile nursemaid; in which encouragement would largely take the place of inhibition. And sure enough the new Minister quickly evinced a burning desire to know more about our Industry, on the short-term view because of the war demand for more and more gas and, looking further ahead, because it was destined clearly to be one of the corner-stones of the national fuel policy which the "new era" would obviously demand of his Ministry. In fact, the urgency of his thirst for knowledge soon gave rise to anxious moments in an Industry which not only has always been prone to take its time but was, in addition, very heavily involved in work of "national importance." His patience has, however, now been rewarded, and to complete this short historical survey, we can record that the result of the work begun at the request of the Board of Trade in 1941 was handed to the Ministry of Fuel and Power in the shape of a monumental survey last Thursday.

This brief tracing of the hitherto history of the Report serves another purpose. It focuses attention on the all-important change which has taken place in circumstances affecting the Industry since the idea of the Report was first conceived. Coal and electricity, we used to think in those days, were always the pets of the politicians, each apparently receiving favour after favour from its own sheltering Ministry, while gas quite frankly suffered under a perpetual inferiority complex—for ever felt the need to struggle for what it called recognition. And then suddenly the exigencies of total war called into being the new Ministry, which gathered under one umbrella all the fuel industries, and here surely was the recognition which our Industry had always craved, slow as some of its members have been to grasp the fact. But this change in circumstances undoubtedly complicated the task of the Planning Committee in so far as its terms of reference included the "altered conditions of the future"; it is unthinkable that these conditions should be based upon anything except a comprehensive national fuel policy, and, though such a policy may well be under consideration at the Ministry, it has other desperately urgent short-term problems to tackle in the meantime, and the Planning Committee of the Gas Industry could do no more than guess at the shape of things to come.

This uncertainty as to future conditions is voiced in the Planning Committee's suggestion of a National Fuel Advisory Committee, and it no doubt accounts very largely for the whole nature of the Report, which concentrates rather upon "collection and collation of relevant information" than upon other aspects. It does, in fact, give a very comprehensive account of what the Industry is able, and intends moreover, to contribute to national and social welfare, and of the minimum legislative requirements to enable it to do so. And that a Ministry which will for certain be charged with the formulation of a national fuel policy can do anything but welcome such suggestions is unbelievable, except by those who take the inane view that this particular Ministry exists for no other purpose than the confounding of the Gas Industry, and that its personnel is specially selected for its inability ever to learn to appreciate the Industry's achievements or potentialities. There, perhaps, we may for the present leave the Ministry of Fuel, with a shrewd guess that, if it is working overtime, the cold towels swathed about its fevered brow are there for some other reason than that it is trying to digest in a few hours the Report which has cost the Gas Industry so much hard thinking. If the Ministry so desires, or if, as is quite possible, a strong desire is expressed by any substantial force within the Industry, no doubt in due course a judicial enquiry will be held to sift the material put forward by the Committee. When we reported a week or two ago that all the districts except one had agreed that it be forwarded to the Minister, this did not imply that they almost unanimously approved the Report itself. Upon this point we are without exact information.

And this national fuel policy to which we all look forward as an integral part of our postwar world, as the final release from a state of fuel affairs which we have for long enough, but quite helplessly, regarded as unsocial. Can we really and truly picture it as being produced from a Whitehall hat, and imposed upon us as a cut-and-dried plan? Surely to us, in collaboration with our sister fuel industries and under the co-ordinating guidance of the Ministry, will be entrusted the eventual shaping of this great plan for squeezing far more human comfort than ever before out of our available resources. For that, in brief, is what it all amounts to and (to use a current colloquialism) so what?

In public houses and places where they whistle to keep up their spirits (or often enough in these days because there are not any), it is fashionable, so we are told, to display the famous words of Queen Victoria on the subject of depression. It is such a pity that the Gas Industry cannot share the fine sentiments of the Sovereign under whom it grew up, and say likewise that there is no room for depression in its house.

But no. There is much wringing of hands, there are many expressions of opinion that the Industry is in a dire muddle, and in the midst of doing a tremendous job of war work we would almost give the impression that, as soon as it is finished, we shall lay us down and die.

What, then, do the Jeremiahs find so fundamentally the matter with our Industry? In an effort to find an answer, we have scanned in vain the endless thousands of words in the Report, and, lest we missed seeing the wood for the trees, we turned to the Digest. We were reminded, it is true, that we shall have to supply a sulphur-free gas, perhaps wash for ever for benzole, and certainly face up to an adequate national scale of salaries. But what engineer and manager would not secretly welcome some measure of compulsion on these and similar matters with which to approach his owners? So, dismissing these as causes for depression, and realizing that some people will almost certainly regard the Report as prejudiced, we turned once again to the call to arms, the challenge, issued at the 1941 Institution Meeting by Dr. E. W. Smith, who subsequently so completely won the confidence of the Industry during his all too brief tenure of office under the Ministry of Fuel. And Dr. Smith foretold that "the Industry has an excellent future *only* if, as an Industry, it is rationalized."

Is this, then, cause for depression; the fact that by rationalizing we have before us the certainty of a brilliant future? The answer, we believe, is that it is the main reason at all events for *the* depression under which the Industry is suffering, because the Industry has made up its mind that there can be no rationalization without what has come to be known as integration. And integration for the Gas Industry is a very, very nasty problem. It is made no easier, however necessary it may be to plan for days of peace, by the fact that all energies must meantime be concentrated on the climax of the tremendous war effort, and in any case the Gas Industry has never been better than the rest at facing up to uncongenial tasks. In that Industry, as elsewhere, no body or individual relishes the idea of having to abandon, even in the name of high ideals of service, one scrap of independence or authority previously enjoyed. But it is no use trying to disguise the fact that the supreme obstacle to agreed integration is the present division of the Industry between municipal and private ownership; we are sorry not to find this categorically acknowledged in the Report. Private owners are generally amenable to a deal if it seems to them to make business sense; at times they can be cajoled by fair words; they can even, in the last extremity, be browbeaten. But municipalities are a law unto themselves. For obvious reasons they are subjected to quite other influences, and even Government departments dread the necessity of applying legislation to them. Moreover, as is this time emphasized in the Report, there are in existence already such excellent examples of varying forms of integration that it is gravely open to doubt whether any one of them is more suitable than the others for universal application. Why, it may be asked, is such a sweeping measure of integration necessary; why not let the awkward and the inefficient stew in their own retorts? The answer is that the coal they would continue to mishandle is a priceless national asset, and that we recognize that the consumer, from the biggest industrialist down to the small householder, is entitled to the best fuel service which modern science can provide, regardless of what authority supplies it. Parenthetically, and since unfortunately the political aspects of nationalization must needs have been introduced into the argument, we are of opinion that the consumer will continue to be base enough (or shall we say human enough?) to enjoy good service for its own sake without squeamishly questioning whether the supplier has given it from the private profit motive, for the benefit of the rates, or simply because he loves his neighbour as himself.

It being agreed, then, that this reorganization, certainly in its initial stages, is bound to disgruntle a goodly proportion of our fraternity, can we not cast depression aside and tackle it bravely and resolutely, the sooner to have done with it? Not that we think it can be by any means a rapid process. But we do believe that, as it develops, it will not be found the drastic and wholesale sweeping away of rights which is the picture conjured up in many minds by the mere thought of it. Many who were drawn unwillingly into the holding company net soon came to realize that identity could still be maintained under integration and that, indeed, to some it afforded unexpected opportunities.

What, then, are the obstacles to setting promptly about this problem with a genuine determination to see it solved? Apart from everybody's preoccupation with the winning of the war, we unhesitatingly name as the principal one the fact that no start can hopefully be made until there exists a central national body in which the Industry unitedly has full confidence. In this matter of integration, it has long enough been quite evident that some measure of compulsion will be required—naturally the less the better. And unless there is general agreement as to what elected body, or even individual, is competent to decide where compulsion is needed and in what shape, and thereafter approach the Ministry for the necessary powers, it appears that we shall remain far removed from the so loudly proclaimed ideal of service to the nation.

How, then, does the British Gas Association progress? On paper, it should certainly fulfil the function outlined above; but where is it, or when will it be? Do the tedious processes of its creation indicate that it will emerge perfect in form, fashioned by divers hands working in perfect harmony? We hope so, because our Industry at this juncture has need above all things of just such a British Gas Association as that—a paragon among associations to replace the rightly or wrongly discredited, certainly far from universally acceptable, leadership of the existing national bodies in the last decade or so. We hope that hope will not be too long deferred.

We began this article with the heading "The Planning Report." As we conclude it, it occurs to us that on the Report itself and its 210 separate paragraphs we have made little enough comment. This, we hasten to assure them, is intended as no discourtesy to the valiant fourteen who, with their Conveners and their Drafter, have given so much time and labour to its composition. If anybody particularly dislikes anything in it—well, somebody had to compile a report. And if anybody dislikes facts, of which the Report is preponderantly composed, he has the job before him of trying to persuade a majority of his fellows to collaborate with him in remedying that which he finds amiss. It is for these reasons that we have deemed it more useful at this stage to essay a general review of the circumstances in which the Report has been issued than to dissect it point by point. For the time being it "lies on the table," and we understand that provision has been made for a wide circulation of it throughout the Industry—so wide that, if we confine ourselves to reproducing in our columns, when space permits, the excellent "Digest" of the Report, we shall have done our duty to it for record purposes, without depriving anybody of the opportunity of reading the full text. May we finally appeal for every opportunity to be given to the "Juniors" to make a thorough study of it. May we even ask that it be made part of their duties, and if special sessions of their associations can be arranged for its discussion, preferably with a member of the Planning Committee present to note the trend of thought and comment, an exceedingly useful purpose will be served. It is, after all, the "Juniors" of to-day who will be responsible to-morrow for upholding the new standard of gas service which we are pledged to set up.

1943 "Journal" Directory

Page 28. GAS LIGHT & COKE COMPANY. N. Willsmer, Dep. *C.E., vice* J. S. Thorman. W. E. Davies, *Station E.*, Nine Elms. J. A. Hepworth, *Station E.*, Kensal Green. J. Burns, *Station E.*, Stratford.

„ 66. STOKE-ON-TRENT. J. E. Stanier, *C.E. & G.M., vice* A. Mackay, retired.

„ 68. TEIGNMOUTH. R. Mason, *M., vice* H. Higham, deceased.

„ 84. EYEMOUTH. W. Steven (Cove), *M.*

Diary

Nov. 5.—National Smoke Abatement Society: General Meeting and Conference, Caxton Hall, S.W. 1, 10 a.m.

Nov. 8.—National Federation of Gas Coke Associations: General Committee (Special Meeting), Gas Industry House, 2.45 p.m.

Nov. 9.—National Federation of Gas Coke Associations: General Committee, Gas Industry House, 9.30 a.m.

Nov. 9.—National Gas Council: Central Executive Board, Gas Industry House, 2.15 p.m.

Nov. 9.—Illuminating Engineering Society: Meeting at the E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C. 2.

Nov. 10–11.—Conference on the Problems in the Utilization of Small Coals: Institution of Civil Engineers.

Nov. 15.—London and Counties Coke Association: Finance Committee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 1.30 p.m., Gas Industry House.

Nov. 17.—Eastern Counties Gas Engineers' and Managers' Association: Gas Industry House.

Nov. 26.—Southern Association of Gas Engineers and Managers (Eastern Section), Paper by Dr. Weston and Dr. Haffner, entitled "New Evidence in regard to the Mechanism of Carbonization in Continuous Vertical Retorts," Gas Industry House.

Letters to the Editor

Gas Industry Reconstruction

SIR,—I thank you for including my scheme for the reorganization of the Gas Industry in your issue of Sept. 29.

In an Editorial on Oct. 20 you state that I advocated nationalization. This statement is unjustified and misleading to your readers. In my scheme there is no mention of nationalization whatsoever.

Public ownership, as set out in my scheme, is entirely different from nationalization. The latter involves State ownership of all plant, machinery, equipment, &c., and the personnel operating the service concerned is inevitably composed of civil servants. The only services providing an example of nationalization at the present time are the postal, telephone, and telegraph services. In my scheme of public ownership, the plant, machinery, equipment, &c., would all be owned by the Central Gas Board, not the State, and there is no question of the personnel operating the service becoming civil servants.

A section of the Gas Industry is using nationalization as a terrifying "bogy," and it is quite misleading for you to describe my proposals as nationalization. There appears to be much confusion of thought regarding any distinction between public ownership and nationalization, and this letter is written in the hope that it may clarify the position.

Yours faithfully,

City of Bradford Gas Department. GEO. E. CURRIER.

October 25, 1943.

DEAR SIR,—My suggestions in outline for a reorganization of the Gas Industry are :

1. Full public control (municipal or regional, or a combination of both forms).

Reasons.—(*a*) The making of profits will be of secondary importance; efficiency and public service of first importance. (*b*) The establishment of a better relationship between consumer and supplier than was ever possible under the old system. (*c*) Every rate-paying citizen will be a potential shareholder taking a keen interest in the municipal and regional works systems, and possess a greater measure of individual power through the more direct system of giving public opinion.

2. A national scale of salaries and wages for all classes of worker.

Reasons.—(*a*) The elimination of much unrest and ill-feeling—gas-workers are in general notoriously underpaid. (*b*) The assurance of a more reasonable standard of life for all employees. (*c*) Better treatment means better service; hence the possibility of higher efficiencies, and greater output will follow.

3. A fully national and co-ordinated industrial educational scheme ensuring a steady supply of three types of junior for absorption into the Gas Industry—commercial, technical, and skilled and unskilled workers.

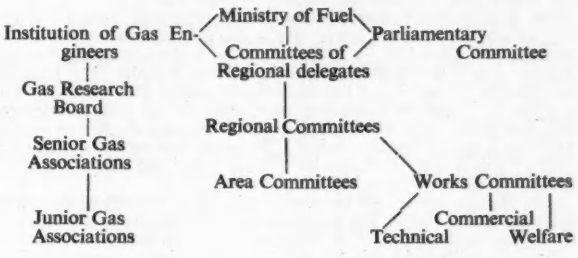
Reasons.—(*a*) A better incentive for young men to make a career in the Gas Industry. (*b*) Better technical education will mean more interest in one's work ; consequently better work and an improved relationship between employer and employee will result. (*c*) The new age coming will be a highly technical one; hence a higher standard will be essential.

4. A new chain of control, given below in bare outline, will be useful.

Reasons.—(*a*) Simplification of control. (*b*) More direct appeal. (*c*) Every employee has a direct voice in the control of works through works committees.

I have given in the foregoing the minimum necessary requirements for the re-establishment of the Gas Industry to bring it into line with the requirements of an envisaged new age. All statements made are non-party, and non-political, and are not intended to raise issues connected therewith.

CHAIN OF CONTROL.



Yours faithfully,

Oct. 21, 1943. "JUNIOR."

National Fuel Policy

DEAR SIR,—There can be no national fuel policy built on sound scientific and economic bases without national ownership and control of the whole of the fuel resources of the country.

What is the alternative? Can the coal, oil, gas, electricity, and coke oven interests all get together to formulate a scheme of national significance in the true interest of the consuming public and of the economic use of our coal resources? Is there any indication that the interests concerned are attempting to produce a coherent national policy for fuel? All the evidence shows that rival interests in the fuel world are preparing for a return to the *status quo ante*, with its disastrous competition and narrow conceptions. The Gas Industry will know full well what this means, if it can remember the slump years.

It is obvious that a national fuel policy must be imposed on the Fuel Industries by the State. This can only be done by State ownership and control. The opposition to State ownership in the Gas Industry is very active, and its activities can be seen by all who care to look. There is no hope for the real development of the Gas Industry as a social service under private enterprise.

What does private enterprise offer us as the post-war plan? Standard calorific value, standard cookers, and ten grains of sulphur. What is required? The expansion of the Industry to carbonize an additional fifty million tons of coal per annum and socially to distribute the products.

It is necessary for all who believe in the nationalization of the fuel industries to be ever active in fearlessly expressing their convictions, and to press by all means for the consummation of that desirable object.

Partington, Near Manchester. JOHN ALBINSON.

Oct. 28, 1943.

Call to Action

SIR,—The "Report on the Planning of the Gas Industry" makes a strong case against the nationalization of the Industry, and clearly establishes that future development should be on flexible and evolutionary lines.

Particularly pertinent to the argument are the observations of the Prime Minister who, in a broadcast address on March 21, said that "there is a broadening field for State ownership and enterprise, especially in relation to monopolies of all kinds. The modern State will increasingly concern itself with the economic well-being of the nation, but it is all the more vital to revive at the earliest moment a widespread, healthy, and vigorous private enterprise."

Further, when the nationalization of the coal industry was under discussion in the House of Commons on Oct. 13, Mr. Winston Churchill stated that "the argument proceeds not on moral grounds but on whether, in fact, we could make a better business of the whole thing for ourselves, a more fertile business for the nation as a whole, by nationalization than by relying on private enterprise and competition."

Whether or not the Gas Industry will ultimately be permitted to continue to operate substantially under its existing structure will largely depend upon the expedition it shows in fully and generously implementing the Report, which—apart from its specific proposals—draws attention to the many problems yet to be solved. The situation calls for the immediate appointment of a Reconstruction Committee, which should formulate a Five Year Plan (1944–1948) and appoint the necessary Sub-Committees to make appropriate and definite recommendations, with a view to their general adoption by gas undertakings before stated dates.

Yours faithfully,

Nov. 1, 1943. "BLUEPRINT."

Institution of Gas Engineers

Assistant Secretary Appointed

The Council of The Institution of Gas Engineers has appointed Mr. ALBERT GEORGE HIGGINS, M.Sc., A.I.C., Barrister-at-Law, to the vacant post of Assistant Secretary of the Institution.

Mr. Higgins was educated at Dulwich College and London University, of which he is a graduate. He is also an Associate of the Royal Institute of Chemistry, a Fellow of the Illuminating Engineering Society, and a Barrister-at-Law at the Middle Temple. Mr. Higgins has been in the service of the South Metropolitan Gas Company for the last 14 years, and has had experience in the central research laboratory and works laboratories, and more recently has served as Outdoor Lighting Superintendent. Since the war he was transferred to the Mains Department, and in 1940 was appointed Works Manager of Gas Efficiencies, Ltd.

Mr. Higgins has served for several years as a member of the Joint Lighting Committee of The Institution of Gas Engineers, and was for four years a lecturer in Gas Engineering (Manufacture) at the Sir John Cass Technical Institute. He is an officer in the Home Guard.

Fuel Research

The Standing Consultative Conference on Fuel Research which has been constituted by the Department of Scientific and Industrial Research to promote collaboration among the various research associations or equivalent organizations engaged on fuel research, and between them and the Department's Fuel Research Organization, had a preliminary meeting on Oct. 21.

In the absence of the Chairman, Sir Harold Hartley, through illness, Sir Edward Appleton presided over the meeting, at which representatives of the Ministry of Fuel and Power, the British Coal Utilization Research Association, the British Electrical and Allied Industries Research Association, the British Refractories Research Association, the Gas Research Board, the British Iron and Steel Federation (Industrial Research Council), and the British Hard Coke Research Association were present.

In his opening remarks Sir Edward Appleton briefly described the objects which the Department had in view in setting up the Conference, and emphasized that membership is voluntary and at the invitation of the Department. The Conference is intended to provide a convenient means whereby the research organizations may keep in close touch with each other, and assist each other by interchange of information and by friendly discussion. Members of the Conference described briefly the aims and scope of their organizations, and then discussed arrangements for the setting up of a central body to undertake the preparation and publication of abstracts of current literature relating to fuel and the maintenance of a register of translations.

It was decided that the next meeting should be held early in January, 1944, when the fuel research programmes of the member organizations would be considered by the Conference.

Midland Association

A Meeting of the Midland Association of Gas Engineers and Managers was held in Birmingham on Oct. 21. The President (Mr. A. H. Cranmer) occupied the chair.

The following new members were elected: R. B. Foster (Lichfield), E. H. Hart (Bridgnorth), E. B. Marriage (Derby), A. R. Myhill (Birmingham), J. E. Stanier (Stoke-on-Trent), and G. Surtees (Uttoxeter).

The President presented to Mr. R. C. Arnold (Loughborough) the following certificates: Second Class, I.G.E., Higher Grade, Gas Engineering (Manufacture), First Class, I.G.E., Ordinary Grade, Gas Engineering (Manufacture); and First Class, I.G.E., Ordinary Grade, Gas Engineering (Supply). He congratulated the recipient upon his success.

Mr. Rendle gave a review of business at recent council meetings of the Institution. For many meetings, he said, there had not been much that had to do with District Associations, due to the fact that technical matters which would have been reported upon were well within the province of the Advisory Board. There were one or two changes of interest. Mr. Briggs, who for so many years had done invaluable work in connexion with education, had been compelled to resign, but they would always look back with happy memories on his work. Another change was that Mr. R. J. Rogers had resigned the Chairmanship of the Codes and Practice Committee, being succeeded by Col. Bywater, a founder member of the Junior Association. He appealed for further support of the Benevolent Fund, and particularly to new members who were not yet contributors.

Mr. A. Forshaw then read his Paper—see last week's "JOURNAL" and p. 564 of our issue to-day.

Manchester District Association

An Ordinary General Meeting of the Manchester District Association of Gas Engineers was held at the Midland Hotel, Manchester on Oct. 29, Mr. William Fletcher (Liverpool), the President, being in the Chair. There was a very large attendance of members.

The President extended a hearty welcome to the following new members: Frank Beaumont, Engineer and Manager, Gas Department, Meltham U.D.C.; Richard John Bradshaw, Deputy Engineer and Manager, Gas Department, St. Helens; Thomas Richards Evans, General Manager, Director, Secretary, Cefn Mawr and Rhosymedre Gas Company, Ltd.; Henry Preston Lupton, Industrial Superintendent, Liverpool Gas Company; Benjamin Cecil Morton, Managing Director, Robert Dempster & Sons, Ltd., Elland; Jack Pollard, Engineer and General Manager, Gas Department, Darwen.

Election of officers for the current year was announced:

President.—Norman Hudson (Mirfield).

Senior Vice-President.—Cecil H. Bamber, B.Sc. (Rochdale).

Junior Vice-President.—G. E. Currier (Bradford).

Committee.—F. A. West (Altrincham); W. A. Dearden (Lancaster); C. Bateman (Harrogate).

The President presented Mr. J. E. Lister Cooper (Yeadon and Guisley Gas Company) with the Past-President's Badge, which it had not been found possible to present at the March meeting. As the members knew, it was now impossible to obtain new badges, but an old member of the Association, Mr. Robert Watson (Bournemouth) wrote to Mr. Lister Cooper and asked him as an old friend whether he would accept his own Past-President's Badge and have his own name engraved upon it.

Mr. J. E. Lister Cooper, in thanking the President for investing him with the Badge, wished also to thank his friend, Mr. Robert Watson, for his magnanimous action in offering his own Badge for the purpose.

The President then stated that he had another pleasant duty to perform, which was to recognize the very valuable services rendered to the Association by Mr. H. Burton, the retiring Hon. Secretary and Treasurer. Mr. Burton had been Hon. Secretary of the Association from 1937, and the members of the Association had decided to present to him some Savings Certificates. It was hoped he would accept them as a mark of the high esteem in which he was regarded, and of appreciation of the services he had rendered to the Association.

Mr. H. Burton (Shipley) in acknowledging the presentation, said he greatly appreciated that sincerity which was the real value behind the gift. When he was informed of the members' generous intention it was agreed that the time was inopportune for the purchase of some permanent reminder of his happy association with the members. Therefore he proposed to earmark the investment for such a purchase when circumstances were more normal.

The work to which the President had referred brought its own reward in the contacts and friendships made. He had derived great pleasure from that work, and wished to take the opportunity of thanking the Presidents he had served and all the members for the way in which they had surrounded him by kindness during his six years of office. It was this support of the officers by the members which gave the Association the solid strength for which it was renowned, and he hoped and felt sure they would all extend the same kindly assistance to his successor. It was a great happiness to him when he learned that Mr. Thomas Haworth had consented to take over the duties of Hon. Secretary, as they all knew his sterling qualifications for the work. He had already shown his abilities in his work for the Lancashire Commercial Section, and he followed both Mr. Bridge and himself, the speaker, in having served the Industry in both the Yorkshire and Lancashire sides of the district, and thus understanding the requirements of all the members. He could not express a better wish than that Mr. Haworth would derive as much pleasure and happiness from his work as he, the speaker, had done.

Certificates were awarded to the following successful candidates:

Gas Engineering, Higher Grade (*Manufacture*).—External students: D. Ferguson, Liverpool, second class; H. W. Kenworthy, Sheffield, second class; M. H. Taylor, Clitheroe, second class. Internal students: R. Pilling, Ramsbottom, first class; R. A. Baines, Burnley, second class; N. R. Bowman, Stretford, second class; F. C. Buckley, Sale, second class; E. F. Kehoe, Manchester, second class; W. Walton, Colne, second class; J. Woodcock, Nelson, second class.

Gas Engineering, Higher Grade (*Supply*).—F. C. Barker, Ilkley, first class.

A Paper entitled "Ten Post-war Thoughts" was then read by Mr. James Carr, M.B.E., M.C., A.M.I.Mech.E., Engineer, Manager, and Clerk, Stretford and District Gas Board, and a discussion followed. These will be dealt with subsequently in the "JOURNAL."

A vote of thanks was accorded to Mr. Carr for his communication. A vote of thanks was also accorded to Mr. Robert Watson for kindly offering his Past-President's Badge for presentation to Mr. Lister Cooper.

A Paper Control Order enables Stewarts & Lloyds, Ltd., to issue refills for their Calender Cases formerly supplied, provided the recipient pays beforehand 1d. for each

The Peterborough Gas Company has declared the following dividends for the half-year ended Sept. 30: £5% per annum on the New Preference A shares, and £7½% per annum on the Consolidated Ordinary Stock, both less income tax.

Conviction that if all companies—gas and otherwise—had profit sharing schemes in operation there would be far less strikes and dissatisfaction among the workers was expressed by Mr. J. Morgan Matthews (Chairman), at the 35th annual meeting of members of the Gloucester Gas Light Company's Profit-sharing and Saving Scheme. The Committee's report stated that the price of gas during the year was 11½d. per therm, and according to the rules no bonus was payable. The Directors, however, had declared a bonus of 2%.

Getting Down to Kitchen Planning

The Domestic Heat Services Committee appointed by the B.C.G.A. a few weeks ago has launched its offensive on the kitchen-planning front. The opening push was made at a meeting of the South-Western District at Exeter on Oct. 21, and the tactics adopted there—an exhibition of model kitchen plans prepared by some of the undertakings in the area, a talk by Miss Jane Drew, the Committee's consulting architect, a full discussion, and the appointment of a local committee to study the subject and maintain liaison with headquarters—are likely to be adopted in all the other B.C.G.A. districts. Kitchen planning, as Mr. P. J. Lucas pointed out, is not a problem that can be solved by one individual or one committee. It needs the co-operation of all the undertakings, and particularly of the district organizations.

Mr. R. C. Taylor (Torquay) presided over a good attendance at the Exeter meeting, a report of which is to be sent to the other Districts by way of suggestion for similar activities. Around the meeting-room at the Imperial Hotel were drawings and models from Bristol and Torquay, and the discussion which followed Miss Drew's talk on "Planning the Kitchen and House of the Future" was indicative of the various efforts so far made and contemplated.

Miss Drew, who is to go to America for six weeks to study kitchen problems there, dealt with her subject from the sociological, technical, financial, and aesthetic aspects, and was very frank in her criticisms of existing practice and suggestions for post-war reforms. She explained how she had tried to limit the number of different types of kitchen to meet the whole situation, and presented details of seven in all—two for reconditioned houses and five for post-war building, bearing in mind that most large towns were contemplating the erection of 50% flats and 50% houses.

Mr. Noel Smith (Bristol) opened the discussion—the Chairman did not envy him the task—by reviewing what Bristol was doing. The post-war plans recently shown at Selfridge's were now on show at the Bristol showrooms, and he had been perturbed by the small proportion of them that made any provision whatever for gas apparatus. He noted the energy with which the electrical industry was approaching post-war planning, and went on to describe the proposals indicated in the model drawings.

Mr. W. T. Lane (Torquay) followed with details and drawings showing how Torquay had studied the post-war kitchen from the point of view of three typical local houses worth, before the war, £500, £1,000, and £1,500.

Sir John Daw (Exeter), Mr. W. J. Baker (Weston-super-Mare), Mr. J. Wesley Whimster (Bath), Mr. H. H. Brown (Exeter), Mr. R. J. H. Clark (Plymouth), and Mr. Edwards (Southampton) followed, and Mr. Lucas and Mrs. E. Murphy (Secretary of the Domestic Heat Services Committee) were there to tell the District what was being done at headquarters, and to enlist the co-operation of the undertakings in the area in providing them with all the information they could. It was explained that representation on the main committee from the Districts awaited the preparation of Miss Drew's report, and it was hoped that when each District had got its local committee to work it would send someone to the main Committee. Miss Drew asked for expressions of opinion on the seven types of kitchen proposed, but Mr. Taylor felt that was a matter that required much study and should be one of the first items on the agenda for the local committee, which was appointed as follows: Mr. R. C. Taylor (Chairman,) Mr. G. Atkins (Bath), Mr. W. J. Baker (Weston-super-Mare), Mr. H. H. Brown (Exeter), Mr. W. T. Lane (Torquay), Mr. J. H. Lowther (Bideford), Mr. Noel Smith (Bristol), and Mr. W. H. Wise (Sherborne).

Optimism and pessimism were blended in the discussion. Mr. W. J. Baker doubted whether it had been wise to quote so low a price for gas as had been given in connexion with the "Coventry" house, when everybody knew the cost of gas-making had gone up by 1½d. per therm, and it would take nine or ten years to get down to the suggested price, and then only by doubling their output. He wondered, too, who was going to pay for the £70–£80 worth of appliances proposed to be put into a £700–£800 house. On a rental basis it would cost a tenant £11–£12 a year. Mr. J. Wesley Whimster retorted that, if anything, the estimate for the price of gas had erred on the high side. His optimism was based on his hope of release from Government control and a return to normal freedom of operation, plus a big increase in demand. Miss Drew's answer to the question of cost was that there must be a move towards cheaper production. Mr. H. H. Brown testified to the value of friendly discussion with the public architect, and Mr. R. J. H. Clark also referred to friendly encouragement in building houses with the right type of kitchen, in preference to treading on the local architect's corns. Mr. Edwards told how a good deal of practical common sense information had been gathered by means of the visitors' book at an exhibition they had held at Southampton, with an average daily attendance of 160 ever since it was opened in the middle of August.

There appeared to be general agreement that architects would welcome the co-operation of the Gas Industry in designing the post-war kitchen. Mr. Lane pointed out that in one way the Torquay undertaking was peculiarly situated, in that it supplied an area that was controlled by a large number of local authorities who, it was realized, must each be responsible for the approval of housing plans, and any approach to one of them on a discussion of kitchen planning might be resented by the officials of the others, but by dealing with the problem on broad lines they were able to be mutually helpful.

A good deal was said about the question of cost, and on this point Miss Drew said she had been doing some interesting statistical work with appliance manufacturers. While it could be assumed that there would not be complete standardization of house building throughout the country, there would be standardization of piping and heating arrangements.

Mr. Lucas wound up the meeting by saying that Miss Drew had approached the subject from the human angle, and if the Industry as a whole dealt with it in that broad way many of its problems would be more easily solved. It was true that the economics of these kitchens would be a little difficult, but they could be solved if there were good and sound human reasons for them.

Miss Drew had intended showing a series of slides, but the discussion proceeded with so much vigour that there was no time left for them at the end of the meeting.

Her Majesty the Queen inspecting the Women's Gas Council exhibit staged recently in the Middlesex Guildhall.

THE OPERATION OF AMMONIA WASHERS

By C. COOPER, M.Sc. (W. C. Holmes & Co., Ltd.)

Introduction

IN common with all other departments of gas manufacture, the technique of gas washing, particularly that of the use of sectional or bay type washers, as distinguished from washing in tower scrubbers, has received detailed study in recent years, intended to determine the basic and theoretical principles governing such operations, and to show how these principles apply to the specific problem under consideration. One may cite the Paper by Hollings and Silver to the Institution of Chemical Engineers, 1934 (see also "GAS JOURNAL," **205**, 307–11 and 372–79, 1934), the dissemination of data by manufacturers of chemical plant, and the memoranda sponsored by The Institution of Gas Engineers on the subject of benzole recovery, most of which publications have been available to gas engineers and their staffs.

In the present article it is proposed to state some practical rules which are in general based on the information now available, applicable to the recovery of ammonia as liquor, from gas in the ordinary course of purification. Throughout these notes it should be assumed that all references to ammonia imply free ammonia, unless specifically stated otherwise, and the fixed ammonia compounds are ignored, as they are brought down in the early stages of condensation and do not affect the subsequent absorption of the free ammonia.

To obtain the most economical and most trouble-free operation there are three primary requirements: The gas entering should be at the lowest temperature practicable at any given time of the year. If, for example, in winter it is preferable to have a warm gas entering the purifiers, this should be obtained by re-heating, rather than by working the gas through the ammonia washers in a warm condition.

The second condition is that the gas should be in as clean a condition as can be managed, in respect of tar fog, oil fog, or naphthalene. Such a condition is, of course, assisted by a low temperature of the gas leaving the final condensers. Ammonia washers frequently have to work under disadvantageous conditions in respect of cleanness of gas, and their performances are seldom entirely spoilt by the presence of these impurities, but the advantage of clean gas is undoubted over a long period.

The third requirement is a water supply of the softest character obtainable. All ammonia washers, of whatever type, will suffer from the precipitation of chalk, leading to scaling up of the pumps and connexions, in the case of static washers, and the filling, when used with hard water. The dividing line between a satisfactory and an unsatisfactory supply lies at about 6° of hardness. Below this limit the suspension of chalk is usually very light and does not appear to settle out on the adjacent surfaces.

Rate of Water Supply

Table I connects the water requirements per 1,000 cu.ft. with the operating temperature, which is, for practical purposes, the temperature of the incoming gas, with the rate of gas supply, and with the percentage removal of ammonia that is desirable. It also takes account of the CO_2 content of the gas, because a high CO_2 content, such as results from heavy steaming of gas, assists the absorption of ammonia in water, and the reverse follows for gases of low CO_2 content, such as high calorific horizontal gas and coke oven gases. The figures in this table cannot be exact for all circumstances, as they are not related to the actual scrubbing surface available, nor to the number of washer bays, but they purport to represent what should be expected of a machine sold under ordinary commercial conditions, and running at or near its rated capacity.

The basic data required for estimating the possible performance of a washer include, as the main necessity, the partial pressures (of ammonia) above solutions of the ammonia compounds existing in the liquor. The most detailed study the writer has available is that made by C. C. Challis and the technical staff of the Australian Gas Light Company, of Sydney, and circulated in Australia some years ago. The curves made up by the Authors are reproduced, with a slight simplification, herewith. It may be noted that they include an adjustment for the gross pressure of the gas in terms of water gauge, but this adjustment is very small for pressures of the normal order for gas-works, and it has been ignored for the purpose of Table I.

There are two simple methods of determining whether a sufficient supply of water is being used, to which reference should occasionally be made, but the absolutely important test is always the ammonia in the outgoing gas, because this has an influence on the subsequent purifying operation.

The first of these tests is to compare the liquor strengths in the various bays of the washer. The latter will usually have an even number of bays, say eight, and the ammonia concentration as determined by titration (free ammonia content) at the fourth bay counting from the water inlet—that is, at the half travel—should be less than one-half that at the eighth bay. In the case of a 12-bay washer, these figures would be the sixth and twelfth, and similarly for other even numbers. If the concentration at half travel is less than that at the full travel, a sufficient supply of water can generally be assumed. If the concentration at half travel is higher than one-half of that at the outlet of the washer, an insufficient water supply can be suspected.

Another test is to make a careful titration on the first bay, counting from the water inlet. Basing on the same data as have been used for compiling the above table, and assuming as before a commercial efficiency of the washing apparatus, Table II shows the concentrations of free ammonia at this point, which should result in the passage of approximately 5 grains of ammonia into the purifiers.

In a recent case used for check purposes, an 8-chamber washer on 100% load at 61°F. had an ammonia strength of 0.24% in the water inlet bay, and was passing approximately 5.2 grains, with CO_2 in gas 3.5%. With 5 grains passing, the liquor in this bay would have been about 0.23%, whereas the table calls for 0.18% at CO_2 3%, or 0.23% at CO_2 4%.

The Strength of Liquor which can be made under any given set of circumstances will clearly depend on the same considerations as furnish the figures given above for water supply, and it should also be noted that as a general rule, the more heavily steamed gases will have a smaller residuum of ammonia after condensation than the gases from coals distilled without steaming. Where, say, 30 to 40 gallons of weak liquor are being made per ton of coal carbonized, as virgin liquor, it is clearly impossible to finish with a mixed liquor above a certain strength. When the whole of the available ammonia, which may amount to 6 lb. of free ammonia, has been absorbed in the virgin liquor plus a few extra gallons per ton of added water, the maximum strength for mixed liquor is practically automatically found. In a case such as this, if there are 30 gallons per ton of water produced as virgin liquor, and 8 gallons per ton of water added in the ammonia washers, the maximum concentration is that represented by 6 lb. of NH_3 in 380 lb. of water, or approximately 1.6%. The corresponding figures for horizontal retort gas are naturally more favourable.

Better average results are obtainable by using stripped liquor deliberately made for the purpose, as the absorbing medium, instead of extraneous water. Thus, in the above cited case, the 6 lb. of NH_3 can theoretically be brought down into 300 lb. of water, giving an average concentration of 2.0% free ammonia.

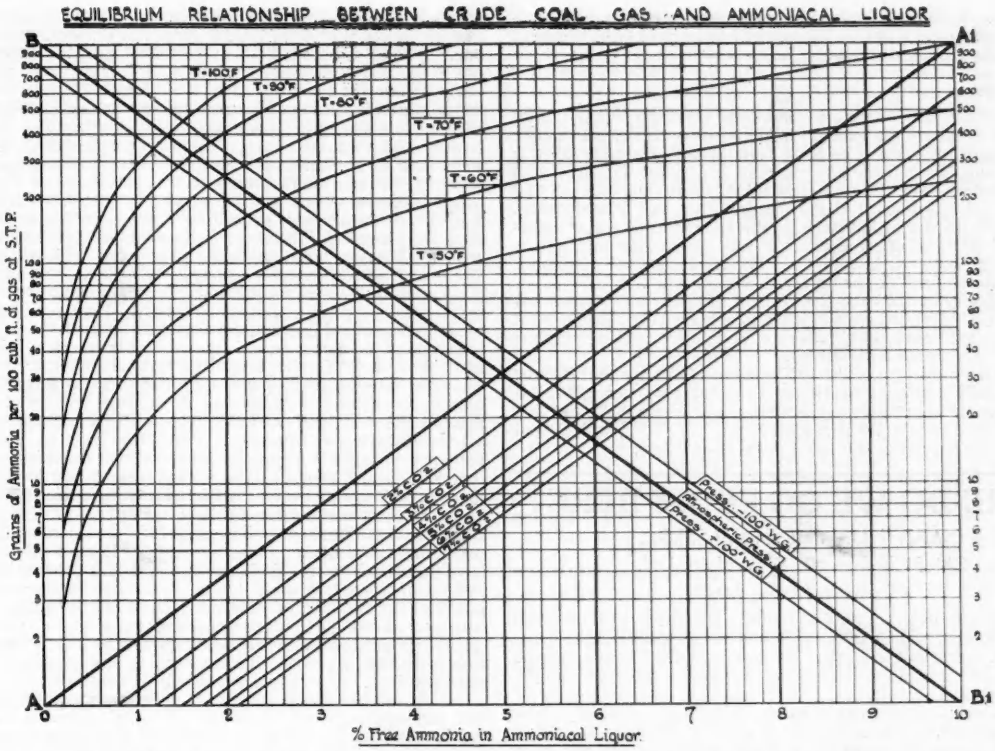
Higher concentrations of ammonia liquor can sometimes be obtained in a washer than are indicated by the quantities given in the table, these resulting from a slow absorption of extra CO_2, leading to lower partial pressures of ammonia in the liquor passing through the machine, and therefore to an increased absorbing capacity. The times of reaction required, however, to give this type of washing full scope are very long, owing to the slow formation of the bicarbonate, and they are not frequently found in practice. These extra reactions, however, are promoted by low temperatures, which are therefore advantageous on all possible grounds.

TABLE I.

CO_2%.	2.					3.					4.				
Temperature, °F.	60	65	70	75	80	60	65	70	75	80	60	65	70	75	80
Ammonia extraction efficiency.	Gallons water per thousand cubic feet.														
98%	0.55	0.77	1.02	1.32	1.74	0.40	0.55	0.74	0.98	1.29	0.32	0.44	0.59	0.79	1.06
97%	0.51	0.71	0.95	1.25	1.61	0.37	0.50	0.68	0.91	1.20	0.30	0.40	0.54	0.73	0.98
96%	0.47	0.65	0.88	1.16	1.50	0.35	0.47	0.63	0.84	1.11	0.27	0.37	0.50	0.67	0.91
95%	0.44	0.60	0.81	1.07	1.38	0.32	0.44	0.59	0.78	1.02	0.25	0.34	0.46	0.62	0.84
93%	0.41	0.56	0.76	1.00	1.30	0.30	0.41	0.55	0.73	0.96	0.23	0.32	0.44	0.59	0.79
90%	0.36	0.50	0.67	0.88	1.14	0.27	0.36	0.48	0.64	0.85	0.21	0.29	0.39	0.52	0.69

TABLE II.

CO_2%.	2.					3.					4.				
Temperature, °F.	60	65	70	75	80	60	65	70	75	80	60	65	70	75	80
1st bay liquor, % of NH_3	0.15	0.10	0.07	0.05	0.04	0.20	0.13	0.09	0.07	0.06	0.25	0.17	0.12	0.09	0.07



To use the curves: For example, to estimate the partial pressure of NH_3 over a 10 oz. liquor at 70°F., take 2.2% on the base line (equal to 10 oz. strength), transfer vertically to line for 70°F., transfer horizontally to the line AA_1, from this intersection vertically to the line for CO_2 content, and from here horizontally to the line BB_1. From this intersection pass up or down to the extent for the estimated pressure (usually down), and thence horizontally to the vertical axis to read grains per 100 cu.ft. (for atmospheric pressure and 2% CO_2 = 100 grains). It will be seen that a pressure of, say, 20 in. water does not greatly affect the result as compared with the zero pressure value (line BB_1).

Washing with Weak Liquor

Virgin liquors are seldom of a concentration below 0.5% free ammonia, unless a particularly selected portion can be obtained from the hotter part of the condensing system, when a possibility of 0.3% may exist. A liquor such as this, when thoroughly cooled, may be capable of absorbing in the final washer a considerable proportion of the ammonia which has passed through the condensers, but it will seldom be found that it can bring the outgoing ammonia in the washer to the figure required for purification, and consequently there is not much probability of entirely eliminating water addition by washing with unstripped weak liquor. The use of such liquor in Livesey washers is justifiable on the grounds of completing the cleaning of the gas—that is, employing the Livesey washer as a tar extractor—but the reduction of the ammonia content of the gases passing into the final washer has only a minor effect on the amount of water to be used in the latter, unless the Livesey washer is supplied with a weak and well cooled liquor. This follows from the theoretical consideration that the amount of water to be used per unit volume of gas is dependent chiefly on the volume of gas, and is not materially affected by the initial concentration of ammonia in the gas.

Liquors of low strength have been successfully employed in ammonia washers, to replace the feed water, by saturating them with CO_2 before they enter. The partial pressures of ammonium bicarbonate solutions are much lower than those of the normal carbonates, which are the usual products of ammonia washing, and therefore such bicarbonate solutions have a greater absorbing power than would be estimated from the above table. Such methods are, however, not in common use, and are chiefly justified on larger installations. Such liquors will not give a very low final ammonia content, but will, in many cases, keep the figure down to that considered suitable for purifier action.

In many cases in practice weak liquor is admitted to parts of the washing system in an incompletely cooled condition, and any possible economies which could then have resulted by its use are discounted by the elevation of the gas temperature.

Maintenance

In the case of a washer with a multiple pump practically all that is required is normal lubrication at points provided. This applies also to the driving engine and speed reduction mechanism. Other pumping systems will require corresponding attention.

Lubrication of motors, if any, should only be carried out to makers' instructions.

The speeds of engines should be checked occasionally, as this is a means of ensuring the full output from the multiple pumps. In the case of "Multifilm" washers, the performance of the latter can also be observed through the windows above the sprays, and means are provided for cleaning these windows internally by drawing back the handle which projects from the spray tube, after which, by turning the same handle, the spray tube is rotated, and the spray cleans the windows. The spray tube should then be returned to its original position and the handle left vertical. The jets which produce the spray can be cleaned at any time by turning this handle from side to side, which works a cleaning rod in each slit. This is done without previously drawing back the rod.

Water Feed

It is usually easier to wash the ammonia content of the gas below a certain limit than to observe a precise figure for the ammonia required to enter the purifiers. Where the water supply is likely to be variable in pressure, it is often found that on the average too much water is added to cover the periods when the supply may be deficient. This leads to the production of a weaker liquor than is absolutely necessary. In such a case a small supply tank at a suitable height, with a float-controlled water admission valve, which will permit the drawing from this tank of a perfectly uniform supply, will then permit of working nearer to the prescribed figures, and it may be expected that the effect of fluctuations in water supply pressure to the tank will be substantially eliminated.

In some cases, however, it may be advisable to wash the gas with excess of water to well below the limit required, and to by-pass a small proportion of unwashed gas to the outlet of the washer. This will generally guarantee a comparatively uniform admission of ammonia containing gas to the boxes, but this procedure must be followed with discretion, otherwise unnecessarily weak liquors will obviously be made because of the excess of water which is continually being put through the washer.

In cases where the rate of gas production will vary by reason of the intermittent charging of retorts, it is likely to be difficult to strike a reasonable average rate of water addition, and in general an excess must be added to cover the heavier loads without necessarily making a full adjustment for the reduced load. The bulk of liquor in the reservoirs in the washer assists considerably in levelling out such fluctuations, but will not eliminate them altogether. It must also be remembered that there may be daily variations in the temperature of the gas entering the washer, which will create somewhat similar con-

ditions, and clearly it is not possible, without certain special provisions, to adjust the water to the required amount at every moment, and some compromise is therefore necessary.

Purification

Under normal gas production conditions ammonia liquor cannot be expected to relieve the load on oxide purifiers to any measurable extent. Taking the case of a total NH_3 production of 6 lb., this represents, say, 30 gallons of liquor at 2% ammonia. The H_2S content is seldom more than ¼ equivalent of normal sulphide, so that 6 lb. NH_3 will take away 1.41 lb. of sulphur or, say, 10,000 grains. At a gas make per ton of 16,000 cu.ft., this represents 64 grains reduction. This, a hypothetical case, is a very favourable one, and is unlikely to be achieved in practice. The small amount of sulphur compound in the fixed liquor hardly affects the result.

In the majority of cases the H_2S content of the liquor is much less than this, particularly where the gas has a high CO_2 content, so it will be seen that even a 10% reduction in sulphur entering purifiers is a rather improbable achievement.

Similarly the reduction of the CO_2 content of the gas that may be possible by fully saturating the liquor with CO_2 is not very great. If all the carbonate were converted to ammonium bicarbonate, the CO_2 in the gas would not fall by as much as 0.5% (*i.e.*, 4.5% to 4%), and one-half of this reduction is a more probable estimate.

WHERE DO WE GO FROM HERE?*

By ARTHUR FORSHAW, M.Sc.,
Chief Chemist, R. & A. Main, Ltd.

(*Continued from p. 531*)

I take it that the object of the Gas Industry is to capture the domestic space-heating load and in so doing it has several strong cards—*e.g.*, that the fuel it employs, either gas or coke, is derived from processed coal, which is thus made to yield its greatest value to the nation in by-products and the like before it is finally used up, and that the use of this fuel prevents atmospheric pollution due to smoke and, in a lesser degree, to sulphur. Unfortunately the value of these cards is either not realized by the consumer, or is offset in his mind by the more immediately obvious weak card—*viz.*, cost as compared with coal. So long as we continue to send some 50% of the heat of combustion up the flue the case is closed, and we shall only be able to compete in the field of occasional and intermittent heating. Possibly you may think this is an old tale and that I am flogging a dead horse, but until practical measures are taken and things begin to move in the required direction I cannot believe that the necessity for keeping the subject before us has lapsed.

Before leaving this particular point, then, I might sum up and say that before we can attain our object we shall need an increased use of convected heat preferably as "background" heat, and a reduced loss up the flue. For the appliances to give these we of the appliance side must be responsible, while the gas side will have to reduce its price, by one means or another, and get rid of sulphur, for it is that which makes direct convection heating often less comfortable than it might be and causes damage to furnishings and fittings, while, if necessary, the question of ventilation must be reconsidered as a separate problem.

You would hardly expect me to leave this subject without reference to some of the technical features that have been associated with it of late years or are in prospect.

Speaking in this City with bated breath, I would ask where now is that epoch-making word which once met you as you entered the railway station or emerged from the tube, that stared at you from the hoardings and from your newspaper or magazine. Yes! Injector-Ventilator! Probably those present have forgotten the origin of the term and its *raison d'être*. The movement in favour of larger flue outlets and therefore, incidentally, of more ventilation was in full swing about 30 years ago. Eventually, in pursuit of this end, one firm adopted the *Lancet* test which, briefly, means that the fire shall pass all its products of combustion through the flue outlet without the aid of any flue-pipe or chimney pull. This was not an easy condition to fulfil, and their fires only passed the test because they had "canopies" which extended downwards until their lower edge was well below the level of the flue outlet. This construction had the drawbacks of directing over the tops of the radiants the air drawn in by the draught and so of slightly cooling them, and further, of intercepting some of the radiant heat from the top of the radiants, the net result of both being naturally a reduction in radiant efficiency. Another firm found that by casting a horizontal ledge on the inner edge of the canopy a streamline effect was produced in the mixture of products and air. This resulted in an easier passing of the *Lancet* test, and consequently in allowing the lower edge of the canopy to be raised with reference to the radiants. Meanwhile a third firm had been experimenting with the idea of removing the products, as undiluted as possible by cold air, through one passage and the ventilating air separately through another passage, so that it did not cool the radiants by passing directly over them. This idea was not immediately successful, but they made their fires, which had high canopies, pass the *Lancet* test by using an nner canopy, which streamlined the mixture of products and air, the space between the bottom edges of the two canopies being blocked by a ledge projecting outwardly from the inner one. It then occurred to them that the ledge, the edges of which had to be fitted to the contour of the outer canopy, was an unnecessary complication, the omission of which would save material in the casting and labour in the fitting. The inter-canopy passage was thus eventually left free, and the "pull" generated in the chimney flue caused air to flow through it from the room. Thus they got partially, and in another way, some such effect as they had previously been seeking—*viz.*, two separated streams, one of them, in this case however the larger, of mixed products and air and the other of air only. It might be said that this air stream was induced flow or flow by induction, but they apparently ascribed it, loosely, to flow injected by the action of the ordinary flue outlet and hence the catch-word "Injector-Ventilator." There was, of course, no actual injector action, or at any rate none that could be detected by the scientific tests directed to that end by independent workers at Leeds University. However, the name was a good commercial one and continued to be used.

The point I am coming to is that since the so called injector-ventilator fires, with double canopies, were abandoned, the Industry generally has reverted to low canopy fires with radiants filling the fire opening from top to bottom; thus all the large volume of air induced into the chimney flows over the upper radiants and cools them, with a consequent loss of efficiency. Either this must be so, or else the previous propaganda about the benefit of high canopies, space above the radiants and the like, which was repeated and forced home by those interested with every possible advertising device for a period of 15 to 20 years was, to put it mildly, all ballyhoo. I am aware, of course, that modern bunsen-burner-heated fires are, other things being equal, more efficient than those of, say, 10 or 15 years ago, for advances have been made in the design of radiants and the heating of them, and this increase may mask the loss by cooling, but it seems to me a pity that for the sake of what is no more than a fashion ("but the consumer is asking for fires with radiants filling all the space") a certain proportion of efficiency, hard-won by the exertions of the technical staffs, should be thrown away to suit so-called commercial considerations. The Industry is supplying consumers with an expensive fuel, and our justification is in considerations such as efficiency and convenience; it is incumbent on us, therefore, to ensure that the utmost efficiency can be guaranteed so that the consumer gets the utmost heat for his money, and that the country as a whole gets the utmost value from its only material asset—*viz.*, our irreplaceable coal supplies, which we are helping to use up.

For my part I believe that the present use of the gas fire as a two-purpose appliance—*i.e.*, for both heating and ventilation—is wrong in principle. The two objects should be kept separate. The gas fire should be regarded primarily and solely as a heating appliance, and as such should be made as efficient as possible. It should be made to pass a modified *Lancet* test because it may have to be used in conditions where no lower standard would enable the products of combustion to leave the room, but it should be provided with means of limiting the air induced by chimney action to a minimum for other situations, while ventilation of the room should be separately considered, and thus made effective at the lowest possible running cost.

When one realizes the tremendous quantity of air that can be moved by the heat from the combustion of even 1 cu.ft. of gas per hour applied *ad hoc*, the present method of burning, say, 30 cu.ft. per hour in a gas fire and of utilizing the heat from some 15 to 18 cu.ft. of this for no other useful purpose than to remove an unnecessarily large quantity of air from the wrong part of the room, is, to quote the old saying, "not only a crime but a blunder." We have, in fact, in my opinion, been spoilt as a nation by cheap coal, its fostering of the open coal fire with its extravagant use of fuel and its high rate of ventilation, and that from the wrong part of the room. That neither the open fire nor the excessive ventilation is really necessary to health is proved by the experience of other countries whose national systems of heating do not rely on such wasteful methods. It seems doubtful whether after this war we can continue as a nation to pay the price for the fad of the open fire which wastes our national assets and pollutes our atmosphere; the same reasoning applies, as to wastage, to present-day gas fires and ventilation.

There remain one or two matters that seem to call for mention—*e.g.*, the latest forms of gas fire (*viz.*, those with luminous flames). Owing to the fact that direct flame contact with the radiating material must be avoided, this type of fire cannot be expected to give a radiant efficiency equal to that of fires making use of flame contact, nor, so far as tests show, do they do so. If, therefore, the advantages of luminous flames, such as noiselessness and freedom from maintenance troubles, are to be realized without loss to the consumer, and eventually to the community, convecting devices adequate more than to restore the incidental loss must be used with such fires, which must clearly also be fixed in such a manner that the warmed air is delivered to the room and not immediately sucked up with the draught into the chimney.

The other matter on which it occurs to me to comment is that concerned with selective radiation. I do not think anyone doubts that what are known as short or near infra-red rays, that is those nearer to the actual red of the visible spectrum than the usual longer infra-red "heat" rays, are able to a greater degree to penetrate through the immediate outer skin of the human body and directly warm the blood stream. This results in more comfortable absorption of radiant heat by that part of the body actually exposed to the rays, because

* Paper to the Midland Association of Gas Engineers and Managers, Oct. 21.

otherwise the longer rays are intercepted at the surface and easily produce symptoms of overheating there, as the heat liberated when they strike the surface cannot be dispersed quickly enough. The point on which I have been unable to find any specific information is the quantitative extent to which the material of gas fire radiants can, or, shall I say, actually does convert long infra-red to short infra-red radiation. Assuming a total radiant efficiency of 50%, what proportion of this output is actually converted into near infra-red rays? Is it in fact more than a tenth, that is, 5% of the heat input to the fire? The actual figure seems to me to be of some importance, because unless it really does amount to considerably more than I have suggested in my question, its beneficial effect will be practically unimportant. This is because during the normal heating season the human body, except for the small surface represented by the face and hands, is shielded from radiant heat by clothing, which is, of course, indifferent to the particular wavelength of the radiant energy falling on it.

(A report of the discussion on the Paper will be published subsequently)

SCOTTISH JUNIORS

The Opening Meeting of the Scottish Junior Gas Association (Eastern District) was held in Dunfermline on Oct. 2. Mr. S. G. Melville presided. At the request of the President the members paid tribute to the memory of Mr. Mack Darling, Broxburn, an Honorary Member and Honorary Auditor of the Association for 13 years.

Mr. Melville then introduced Mr. T. B. Livingstone, Perth, as President for the session. Mr. Livingstone returned thanks and, as his first duty, presented Mr. Melville with War Savings Certificates as a memento of his two years in office.

Mr. **Livingstone** then delivered his Presidential Address, in the course of which he said: As you know, we have become affiliated to the Joint Council of the British Junior Gas Associations, and by so doing, have made this body representative of all the Junior Associations in Britain. In my view, this step was one in the right direction, but there is one serious feature which must be recognized. There is little use this Association being represented on the Joint Council which, in turn, is represented on the Council of The Institution of Gas Engineers (or will so be in the near future), if we are not wholly representative of the Juniors in the district we represent. With all due allowance for the effect of the war, it is evident that interest in the meetings of the Association is flagging. It requires but a cursory glance round any meeting to learn that a serious drop in attendances has taken place, and that it is the same few who are keeping the Association alive to-day. The remedy lies in the hands of the members. If the meetings are not sufficiently interesting, then each annual general meeting presents the opportunity of bringing about any changes thought necessary. Attendances at annual general meetings are, to say the least, discouraging. The Association requires your active support, and I ask all of you to endeavour to arouse the interest of your colleagues in our activities.

A little more interest on the part of the Senior Association would also be of assistance and, in turn, individual engineers should give the members of their staffs every encouragement to join a Junior Association, and, if possible, this encouragement should include some financial help towards expenses involved in travelling.

Time was when the subject of education was debated at every annual general meeting. With the majority of students now in the Forces, there is not the same outcry. However, we do owe it to those of our younger colleagues who have still to complete their training to see to it that the maze of rules and regulations are made sufficiently clear and capable of fulfilment. Every engineer should make sure that young men commencing their training are given every encouragement if not definite direction. After all, the newcomers have not the experience to know how best to proceed when faced with a variety of interpretations of the regulations. At the same time, no matter what faults are laid against the Scheme, it does work. Great numbers have taken advantage of it, many having proceeded without difficulty. It is probable, however, that these last-mentioned have lived within easy reach of Glasgow or Edinburgh. The remainder are not by any means so fortunate.

I am at a loss to know why the Halifax Gas College does not receive some degree of official recognition. The subject of Gas Engineering, Manufacture, or Supply is not one which can be taught or learned in a college having only one period of 1½ hours per week during a course of six months. Two such courses of six months' duration represent the recognized standard of preparation for the main subject. The lecturers in the various colleges would be the first to agree that the ground cannot be covered in the time allotted. Text-books on Manufacture are not abundant, and while references in the Technical Press are invaluable, these are not always available to every student. The Gas College can, and does, provide excellent material and guidance as I can testify. The number of Diploma candidates who have received help from this quarter must represent a very large percentage of the total successes. I trust the Institution are considering the question of text-books seriously with a view to action at the earliest possible moment, and that the value of the Gas College will eventually be appreciated by the Education Committee of that body.

Before leaving this subject there is a further point I wish to make. The time is now opportune for the adoption of some definite standard of training or apprenticeship for all student gas engineers. Methods of training up to the present have been, and still are, haphazard. The feeling rather seems to be that certain work has to be done, and it remains entirely to the initiative of the individual as to how and where he can gain wider knowledge and experience. There can be no doubt that if anyone wishes to learn, he will. At the same time, much greater opportunities ought to be provided.

Technical staffs will, without doubt, grow larger when the war is over. I would suggest that some basic method of training be adopted now, and each intending professional gas engineer should follow a period of training such as:

1. Every student shall have reached the standard of the Higher Leaving Certificate or similar qualification, and that the subjects taken shall include Higher Mathematics and Higher Science (Physics and Chemistry).
2. The initial training should include: 18 months in the engineering shop, 18 months in the distribution department (including showroom), 3 months on the retort bench (practical), 3 months on ancillary plant (practical), 3 months in office, 15 months in laboratory as student.

This initial practical training, encompassing five years, would give a young man sufficient background to enable him to be trained thereafter into a valuable member of the technical staff.

There has, since the wider adoption of benzole recovery, been many arguments for and against the practice from financial aspects. Finality, albeit of a temporary nature, came when war broke out. The last few years have also seen a campaign for standard calorific values which culminated in the Report of the Committee of Enquiry on Gas Quality.

It does not require a very thorough examination to see the trend of events in so far as Scotland is concerned. It will be admitted, I think, that in the first place a mistake was made in not re-declaring calorific value when benzole recovery was practised. Mr. Jamieson two years ago addressed a Joint Meeting of the Scottish Junior Gas Associations, and in the course of his reply to the discussion which followed, made the following point in an analysis of the contributions by other speakers: "Benzole, if extracted, should be at the expense of calorific value."

This fact has been driven home in no uncertain fashion by the deterioration in coal quality which has taken place over the last four years. Whereas an undertaking declaring at 450 B.Th.U. per cu.ft. had formerly an ample margin to take up changes in coal quality, the same undertaking, before extracting two gallons of benzole, has to produce a gas of approx. 468 B.Th.U. in the retort house. The deterioration in coal quality has made this, in many cases, an impossibility. Had the calorific value been re-declared to maintain 450 in the retort house, then there can be little doubt that no undue trouble would have resulted.

These facts would suggest that as far as concerns the majority of Scottish works two values are required:

1. 450 B.Th.U. per cu.ft. in cases where no benzole is extracted.
2. 425 B.Th.U. per cu.ft. in cases where benzole is extracted.

It used to be an axiom that "profits are made in the retort house." They still are and will so continue to be. The days when it paid to waste coal in order to make residuals have long since passed, if, indeed, they ever existed, and of course, the present urgent necessity for fuel economy makes the retort house the focal point of interest in this respect. It seems strange, therefore, in view of the experience now gained, that in the majority of cases no attempt was made to maintain normal manufacturing practice, but in each case the calorific value of the gas as made was raised.

Discussion

Mr. **S. G. Melville** (Edinburgh), opening the discussion on Mr Livingstone's address, thanked the Author for the interest he had aroused.

Mr. **W. Masterton** (Edinburgh) said that one reason for the fall in attendances at meetings was due to the fact that visits to works had been more or less abandoned owing to the war, but he thought that attendances were tending to become better now. He thought the education standard suggested was good, and in his opinion some such standard should be the birthright of every child in the country.

Mr. **J. R. Denoon** (Edinburgh) thought that more advantage would accrue if the first five years of training were devoted to works practice—this followed by one or two years on the distribution side. He had found this of benefit, as the initial five years allowed of a greater degree of receptiveness when undergoing distribution training. He was of the opinion that day classes should replace evening classes; in this way a higher standard should be reached without the same strain on the student.

Mr. **R. Cowie** (Hawick) said that when one considered all the circumstances the Association was doing very well. Without doubt travelling difficulties made it impossible for many members to attend regularly. He supported Mr. Denoon's suggestion that day classes should supersede evening classes.

Mr. **R. Air** (Cowdenbeath) supported the remarks concerning Senior Associations, and thought that the travelling expenses of members of Junior Associations should be paid by the undertaking which they served.

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GAS PRODUCTS PRICES

The London Market Nov. 1.

All Coal Tar Products are in good demand, and Pitch in the London area remains about 65s.

An Order entitled The Control of Toluene (No. 3) Order, 1943 (S. R. & O. 1943, No. 976), came into force on July 20, and introduced certain changes in the prices for different grades of Toluene.

There are no changes to report in the prices of Coal Tar Products.

The Provinces Nov. 1.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 11d., pure, 2s. 1d. (controlled by the Control of Toluene No. 3 Order, dated July 14, 1943, operative from July 20, 1943). Naphtha and Xylole controlled by the Coal Tar Naphtha and Xylole Order, 1943, dated May 31 (S. R. & O., 1943, No. 768), operative from June 1. Carbolic acid, 60's, naphthalene, and anthracene controlled by the Coal Tar Products Prices Order S. R. & O. 2509, dated Dec. 7, 1942, and operative from Jan. 1, 1943. Filtered heavy oil (min. gr. 1,080), 7½d. to 8d. Creosote oil has been generally controlled as to direction and price for some time past. Current value—fuel grades 5d. to 5¼d.; timber preservation and other purposes 4¾d. to 6d.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland Oct. 30.

Market continues active. Refined tar controlled. Value is 4½d. per gallon *ex* Works, naked. Creosote oil: Specification oil, 6½d. to 7d.; low gravity, 7¼d. to 7½d.; neutral oil, 6d. to 6½d.; hydrogenation oil, 5⅞d. per gallon; all *ex* Works in bulk. Refined cresylic acid is available in reasonable quantities at 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha: 6¼d. to 7d. per gallon. Solvent naphtha: Basic prices delivered in bulk, 90/160 grade, 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified, 2s. 3d. per gallon. Pyridine: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

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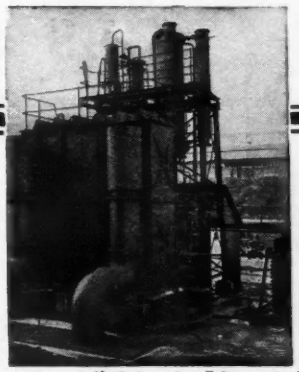

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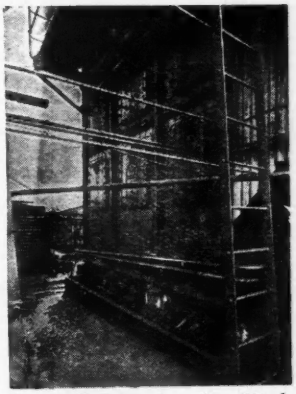

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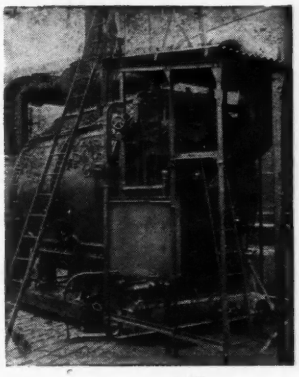

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GAS STOCKS AND SHARES

Markets were quiet and dull at the opening last week, but towards the close a better tone was discernible in places. The chief feature was a sharp rise in home rails, while British Funds were also harder in a few cases.

There was little change in the volume of business in the Gas Market, which continued quiet and uninteresting. Of the few price changes in the Official List—and it is a long time since so few have been recorded—the majority were in a downward direction. The falls, however, were only slight. No changes occurred in the Supplementary List or at the Provincial Exchanges.

The above remarks also apply to the whole month of October, during which fewer price changes have been made than in any month so far this year. The only features were rises of 5 points in Alliance & Dublin ordinary and 5s. in Cape Town 4½% pref.; and in the Supplementary List a gain of 15 points in Mid-Southern Utility "A." Both Gas Light and Newcastle units registered slight reaction

The following quotations were change during the week:

OFFICIAL LIST

Associated Gas & Water Deferred...	21/—22/-	+/-
Commercial Ord.	68—71	—1
Gas Light Units	18/6—19/6	—/6
Imperial Continental Ord.	91—94	—2
Primitiva Holdings, Ltd.	11/6—13/6	—/6
South Metropolitan 6 p.c. Pref. ...	124—129	—1
Wandsworth Cons.	108—113	+1

Quotations on the London and Provincial Stock Exchanges

OFFICIAL LIST

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Oct. 28
1,767,439	Sept. 6	—	2	Alliance & Dublin Ord. ...	105—115
374 000	June 28	4	4	Do. 4 p.c. Deb.	95—100
583,407	May 10	5	5	Asscd. Gas & Water U'd'ts Ord.	20/9—21/9
388,938	,,	—	—	Do. Deferred	21/—22/-
500.000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/3—20/3
535,545	,,	4	4	Do. 4 p.c. Red. Cum Pref.	19/6—20/6
341,966	,,	4	4	Do. 4 p.c. Irred. Cum. Pref.	17/6—18/6
561,370	Aug. 16	7	7	Barnet Ord. 7 p.c.	155—160
300,000	Oct. 11	1/9⅛	1/4⅜	Bombay, Ltd.	24/—26/-
690,407	Aug. 16	7	7	Bournemouth 7 p.c. max. ...	150—155
362,025	June 15	4	4	Do. 4 p.c. Deb. ...	105—110
659,955	Sept. 6	2½	2½	Brighton, &c., 5 p.c. Con. ...	88—93
855,000	,, 13	6	6	Brit. Gas Light Ord.	108—113
545,000	June 28	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115
120,000	,, 15	4	4	Do. 4 p.c. Red. Deb.	92—97
10,000	Nov. 6 '33	6	4	Cape Town, Ltd., 4½ p.c. Cu. Pf.	50/—70/-
626,860	July 19	6	6	Cardiff Con. Ord.	117—122
24,500	June 15	7	7	Colombo 7 p.c. Pref.	21/6—23/6
764,169	Sept. 27	-/9.56	-/9.56	Colonial Gas Assn. Ltd. Ord. ..	¼—¾
400,000	,,	1/3.298	1/3.298	Do. 8 p.c. Pref. ...	¼—¾
1,748,090	July 22 '40	2	3	Commercial Ord.	68—71
620,000	June 7	3	3	Do. 3 p.c. Deb.	67—72
286,344	Aug. 23	5	5	Do. 5 p.c. Deb.	108—113
807,560	,, 23	6	6	Croydon sliding scale	121—126
644,590	,,	5	5	Do. max. div.	102—107
620,385	June 28	5	5	Do. 5 p.c. Perp. Deb. ...	120—125
179,500	Feb. 22	5	5	East Surrey 'B,' 5 p.c.	88—93
176,461	June 28	5	5	Do. 5 p.c. Deb. (Irred.)...	118—123
250,000	July 26	4	6	Gas Consolidation Ord. 'B' ...	19/—21/-
250,000	May 10	4	4	Do. 4 p.c. Red. Cum. Pref.	18/—20/-
19,107,811	Aug. 9	†1	3	Gas Light & Coke Ord. ...	18/6—19/6a
2,600,000	,,	†1½	3½	Do. 3½ p.c. max.	75—80
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref. ...	94—97
2,993,000	July 12	3½	3½	Do. 3½ p.c. Red. Pref. ...	93—96
8,602,497	May 31	3	3	Do. 3 p.c. Con. Deb. ...	84—87
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb. ...	107—110
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	106—109
700,000	Sept. 6	3½	3½	Do. 3½ Red. Deb. ...	96—99
5,600,000	May 13 '40	4	8	Imperial Continental Cap. ...	91—94
43,820	July 26	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100
231,978	Aug. 23	5	5	M.S. Utility 'C' Cons.	95—100
918,657	,,	4	4	4 p.c. Cons. Pref.	89—94
675,000	May 3	‡4	‡4	Montevideo, Ltd.	94—99
300,000	April 27	9	7	Oriental, Ltd.	110—115
368,537	June 15	3½	2½†	Plymouth & Stonehouse 5 p.c.	97—102
621,667	Aug. 16	7½	7½	Portsmouth & Gosport Cons.	120—125
2,381,363	May 17	4†	4†	Primitiva Holdings, Ltd. Ord.	11/6—13/6
233,900	June 15	3½	3½	Do. 6½ p.c. Red. Cum. Pref.	99—104
648,999	Sept. 13	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	21/3—22/3
597,972	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	20/—21/-
2,528,714	Aug. 23	7½	7½	South East'n Gas Cn. Ld. Ord.	21/3—22/3
1,000,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/9—20/9
1,068,869	,,	4	4	Do 4 p.c. Irred. Cum. Pref.	19/—20/-
6,709,895	Feb. 22	†1	—	South Met. Ord.	88—91
1,135,812	Aug. 16	†6	6	Do. 6 p.c. Irred. Pref. ...	124—129
850,000	,,	†4	4	Do. 4 p.c. Irred. Pref. ...	90—95
1,895,445	June 28	3	3	Do. 3 p.c. Perp. Deb. ...	83—87
1,000,000	July 12	5	5	Do. 5 p.c. Red. Deb. ...	103—108
1,543,795	Aug. 3	4	4	South Suburban Ord. 5 p.c ...	97—102
512,825	,,	5	5	Do. 5 p.c. Perp. Pref. ...	107—112
500,000	,,	4	4	Do. 4 p.c. Perp. Pref. ...	89—94
250,000	,,	3½	3½	Do. 3½ p.c. Red. Pref. ...	90—95
888,587	June 15	3	5	Do. 5 p.c. Perp. Deb. ...	120—125
750,541	Aug. 16	6	5	Southampton Ord.	95—100
350,000	,, 15	5½	5½	Swansea 5½ p.c. Red. Pref. ...	100—105
1,076,495	Aug. 3	5	5	Tottenham & District Ord. ...	108—113
338,555	,,	5	5	Do. 5 p.c. Pref.	106—111
453,380	June 7	4	4	Do. 4 p.c. Perp. Deb. ...	99—104
1,247,505	May 31	4	6	U. Kingdom Gas Cor. Ord. ...	21/6—22/6
1,085,952	,, 17	4½	4½	Do. 4½ p.c. 1st Cum. Pref. ...	19/6—21/6
772,709	,,	4	4	Do. 4 p.c. 1st Red. Cum.Pref.	19/—21/-
745,263	June 21	4½	4½	Do. 4½ p.c. 2nd Non.Cum. Pf.	17/—19/-
1,200,000	Sept. 13	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100
380,606	Aug. 16	6⅜	6⅜	Uxbridge, &c., 5 p.c.	118—123
1,371,138	,, 3	6	5	Wandsworth Consolidated ...	108—113
2,525,768	,,	4	4	Do. 4 p.c. Pref.	91—96
1,343,964	June 15	5	5	Do. 5 p.c. Deb.	120—125
383,745	,,	4	4	Do. 4 p.c. Deb.	99—104
558,342	Aug. 9	5	5	Watford & St. Albans Ord. ...	110—115
300,000	June 7	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95

SUPPLEMENTARY LIST

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Oct. 28
351,685	June 15	5	5	Brighton, &c., 5 p.c. Perp. Deb.	117—122
415,250	,,	4	4	Bristol Gas Co., 4 p.c. New Deb.	97—100
140,205	July 26	7	7	Cambridge, &c., 7 p.c. Cons. 'B'	135—140
295,932	Aug. 16	5	5	Cheltenham, 5 p.c. Cons .Ord....	97—102
42,500	June 15	4	4	Do. 4 p.c. Perp. Deb....	95—100
150,000	Aug. 23	4	4	Croydon Gas, 4 p.c. Pref. (Irr.)	91—96
130,000	June 28	4	4	Do. 4 p.c. Deb. ...	100—105
146,700	Aug. 30	5½	5½	East Surrey, 5½ p.c. Pref. 'A' ...	110—115
53,220	,,	6	6	Do. 6 p.c. Cum. Pref. ...	120—125
	Aug. 19 '40	6	4	Eastbourne, 'B' 3½ p.c.... ...	62—67
117,425	Feb. 5 '40	8	8	East Wight Cons. 5 p.c.	65—70
239,135	uly 26	5	5	Gas Consolidation 'A' Ord. (£1)	18/—20/-
156,600	Aug. 16	5	5	Hampton C't, 5 p.c. Cons. Ord.	95—100
18,000	Dec. 29'41	3½	3½	Malta & Med'n., 7 p.c. 1st Pref.	30—40
10,845	June 30'41	3½	3½	Do. 7½ p.c. 2nd Pref.	30—40
50,000	Aug. 23	£5 4 6	£5 4 6	Mid. South. Util., 'A' Cons. 5 p.c.	105—110
70,380	June 21	5	5	Newport (Mon.), 5 p.c. Deb....	110—115
65,000	Aug. 16	5	5	North Middlesex, 5 p.c. Pref....	104—109
70,000	Sept. 13	5	5	Plymouth & Stone., 5 p.c. Deb.	112—117
76,501	June 21	4	4	Reading, 4 p.c. Perp. Deb.	97—102
74,777	Sept. 30	4	4	Romford, 4 p.c. Debs. (Reg.) ...	95—100
21,000	June 15	5	5	Slough, 5 p.c. Perp. Deb. ...	120—125
211,740	,, 28	5	5	Southampton, 5 p.c. Red. Deb.	103—108
363,575	July 1	5	5	Tottenham, 5 p.c. Reg. Red. Mt.	99—102
202,019	Aug. 16	7½	7½	Tunbridge Wells, 4 p.c. Scale ...	125—130
135,257	June 15	5	5	Uxbridge &c., 5 p.c. Perp. Deb.	118—123

PROVINCIAL EXCHANGES

					Quotations Oct. 22
804,948	Oct. 18	5	5	Bath Cons.	102—105
122,577	Aug. 9	7	5	Blyth 5 p.c. Ord.	114—116
1,667,250	July 19	5	5	Bristol, 5 p.c. max.	115—117
120,420	June 15	4	4	Do. 1st 4 p.c. Deb.	100½—102½
415,250	,,	4	4	Do. 2nd 4 p.c. Deb.	100½—102½
328,790	,,	5	5	Do. 5 p.c. Deb.	116—120
157,150	Aug. 3	6½	5	Chester 5 p.c. Ord.	98—102
92,500	June 15	4	4	Do. 4 p.c. Pref.	80—82
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	86—90
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—99
542,270	Aug. 9	9	6	Derby Cons.	121—126
55,000	June 15	4	4	Do. 4 p.c. Deb.	97—102
10,000	Aug. 9	10	10	Great Grimsby 'A' Ord. ...	160—170
6,500	,,	10	10	Do. 'B' Ord. ...	160—170
79,000	,,	10	10	Do. 'C' Ord. ...	150—160
732,000	Aug. 23	4	4	Hartlepool G. & W. Cn. & New	90½—91½
2,167,410	,, 16	5½	5	Liverpool 5 p.c. Ord.	110—111
306,083	July 15	4	4	Do. 4 p.c. Deb.	100—102
20,000	June 21	5	5	Long Eaton 5 p.c. Pref.	9—11
80,000	,,	5	5	Do. 5 p.c. Deb.	100—105
2,430,267	Aug. 3	5½	5½	Newcastle and Gateshead Con.	23/6—24/-
682,856	,,	4	4	Do. 4 p.c. Pref.	101—103
776,706	June 28	3½	3½	Do. 3½ p.c. Deb.	96½—97½
277,285	April 27	5	5	Do. 5 p.c. Deb. '43 ...	99—101
13,200	Sept. 16	8⅜	7	Pontyp'l Gas & W. 10 p.c. 'A'	11½—12½
13,600	,,	6	5	Do. 7 p.c. 'B'	9½—10½
40,000	,,	5	6	Do. 7 p.c. 'C'	9½—10½
106,280	Aug. 9	10	10	Preston 'A' 10 p.c.	167—169
188,219	,,	7	7	Do. 'B' 7 p.c.	124—129
1,806,339	,, 30	6½	6½	Sheffield Cons.	136—140
95,000	July 5	4	4	Do. 4 p.c. Deb.	98—100
332,351	Sept. 6	6	6	Sunderland 6 p.c. max. ...	113½—115½
192,150	Aug. 9	5	5	Weston-super-Mare Cons. ...	108—110
64,338	July 5	4	4	Do. 4 p.c. Deb.	99—101
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	142—147

a—The quotation is per £1 of Stock. * Ex. div. † For year. ‡ Paid free of income-tax.